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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/026,709	12/27/2001	Migaku Takahashi	OSP-11676	9206

466 7590 05/16/2003

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EXAMINER
BERNATZ, KEVIN M

ART UNIT	PAPER NUMBER
1773	

DATE MAILED: 05/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/026,709	TAKAHASHI ET AL.	
	Examiner	Art Unit	
	Kevin M Bernatz	1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13,17,19 and 20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13,17,19 and 20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s): _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. Preliminary amendments to the specification and claims 3 – 6, 9, 10, 12 and 14 - 20, filed on December 27, 2001 and April 23, 2003, have been entered in the above-identified application.

Election/Restrictions

2. The Examiner notes that the restriction requirement presented in Paragraph No. 1 of the Office Action mailed March 31, 2003 (Paper No. 4) is moot now that claims 14 – 16 and 18 have been cancelled.

Specification

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. "Magnetic Recording Medium" is not considered a descriptive title.

4. The disclosure is objected to because of the following informalities: the alloy compositions recited in the specification (e.g. page 39) should be clarified that Cr#Mo refers to a Cr alloy comprising # atomic% of Mo and is not a Cr#Mo1 alloy (e.g. Cr20Mo is Cr with 20 atomic% Mo, not a 20:1 atomic ratio between Cr and Mo (or 5 atomic% Mo). Inserting a sentence such as: "In the above examples, Cr30Mo, for example,

indicates a Cr alloy with 30 atomic percent Mo" would be sufficient to clarify the disclosure.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1 – 13, 17, 19 and 20 are rejected under 35 U.S.C. 102(a) as being anticipated by Djayaprawira et al. (IEEE Trans. Mag., 37(4), 2001, 1497 - 1499).

Regarding claim 1, Djayaprawira et al. disclose a magnetic recording medium comprising a non-magnetic base material and a ferromagnetic metal layer of a cobalt based alloy formed on top of said non-magnetic base material with a metal underlayer disposed therebetween (*Experimental*), wherein a coercive force Hc is at least 2000 Oe (*Table 1*).

It has been held that where claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or

obviousness has been established and the burden of proof is shifted to applicant to show that prior art products do not necessarily or inherently possess characteristics of claimed products where the rejection is based on inherency under 35 USC 102 or on *prima facie* obviousness under 35 USC 103, jointly or alternatively. Therefore, the *prime facie* case can be rebutted by ***evidence*** showing that the prior art products do not necessarily possess the characteristics of the claimed product. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

In the instant case, the claimed and prior art products are substantially identical in both structure and composition (*e.g. Table 1 – Co alloy magnetic layer over $CrMo_{20}$/Cr dual underlayer*).

Therefore, in addition to the above disclosed limitations, the presently claimed property of "an anisotropic magnetic field Hk^{grain} is at least 10,000 Oe" would have inherently been present because the claimed and prior art products are substantially identical in both structure and composition (*e.g. Table 1 – Co alloy magnetic layer over $CrMo_{20}$/Cr dual underlayer*).

Regarding claim 2, Djayaprawira et al. disclose a process meeting applicants' claimed product-by-process limitations (*Experimental section*).

Regarding claims 3 – 11, 19 and 20, Djayaprawira et al. disclose underlayers meeting applicants' claimed limitations (*Table 1; Figures and Results and Discussions section*).

Regarding claims 12 and 13, the presently claimed properties of the "crystal lattice of said ferromagnetic metal layer of said cobalt based alloy" would have inherently been present because the claimed and prior art products are substantially identical in both structure and composition (*e.g. Table 1 – Co alloy magnetic layer over $CrMo_{20}$/Cr dual underlayer*).

Regarding claim 17, the claimed apparatus limitations are nominal apparatus limitations. Furthermore, Djayaprawira et al. disclose using a GMR head (*Experimental section*) and the claimed limitations are deemed to be inherently possessed by a GMR head (i.e. a GMR head must possess a "drive section for driving said magnetic recording medium, and a magnetic head for carrying out recording and playback of magnetic information, wherein said magnetic head performs recording and playback of magnetic information on a moving said magnetic recording medium" inorder to function as a GMR head).

7. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Tamari et al. (U.S. Patent No. 5,851,582).

Regarding claim 1, Tamari et al. disclose a magnetic recording medium comprising a non-magnetic base material (*Example 3 – "glass substrate"*) and a ferromagnetic metal layer of a cobalt based alloy formed on top of said non-magnetic

base material ("*CoO film*") with a metal underlayer disposed therebetween ("*NiO film*"), wherein a coercive force He is at least 2000 (Oe), and an anisotropic magnetic field Hk^{grain} is at least 10,000 (Oe) (*col. 13, lines 18 – 23*).

Regarding claim 2, the limitation "wherein said metal underlayer and said ferromagnetic metal layer are formed in a film fabrication chamber with an ultimate vacuum at a 10^{-9} Torr level, using a film fabrication gas with an impurity concentration of no more than 1 ppb" is a product-by-process limitation and is not further limiting in so far as the structure of the product is concerned. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. ***The patentability of a product does not depend on its method of production***. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." [emphasis added] *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP § 2113. Once a product appearing substantially identical is found, the burden shifts to applicant to show an ***unobvious*** difference between the claimed product and the prior art product. *In re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983).

In the instant case, the claimed and prior art products are deemed substantially identical since both the claimed and prior art products possess comparable Hc and Hk values (i.e. Hc ≥ 2000 Oe and Hk ≥ 10,000 Oe).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1 – 13, 17, 19 and 20 are rejected ***under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over*** Malhotra et al. (U.S. Patent No. 6,303,217 B1) in view of the following evidentiary art: Ikeda et al. (IEEE Trans. Mag., 33(5), 1997, 3079 - 3081), Akimoto et al. (U.S. Patent App. No. 2002/0001736 A1), Bertero et al. (U.S. Patent No. 6,500,567), Howard (U.S. Patent No. 4,652,499), Maeda et al. (U.S. Patent No. 2002/0150793 A1) and Takahashi et al. (U.S. Patent No. 5,853,847).

Regarding claim 1, Malhotra et al. disclose a magnetic recording medium comprising a non-magnetic base material (*Figure 1 – element 12*) and a ferromagnetic metal layer of a cobalt based alloy (*Element 16 and Table 1*) formed on top of said non-magnetic base material with a metal underlayer disposed therebetween (*Elements 14 and 15*), wherein a coercive force He is at least 2000 Oe (*Table 1*).

Malhotra et al. fail to disclose the anisotropic magnetic field of the recording medium.

The Examiner notes that in the instant case the claimed and prior art products are substantially identical in <u>both</u> structure and composition (*e.g. Table 1 – Co alloy magnetic layer over $CrMo_{20}$/Cr dual underlayer*). Therefore, in addition to the above

disclosed limitations, the presently claimed property of "an anisotropic magnetic field Hk^{grain} is at least 10,000 Oe" is deemed to have inherently been present because the claimed and prior art products are substantially identical in both structure and composition.

However, even in the case where the claimed anisotropic magnetic field may not be inherently present, the Examiner notes that it would have still been obvious to one of ordinary skill in the art to optimize the anisotropic field to a large value meeting applicants' claimed limitations inorder to avoid write demagnetization (*as evidenced by Ikeda et al. – Sections III and IV and Figure 2*), to adjust the transition position of the magnetic film (*as evidenced by Maeda et al. – Figures 5 and 7 and Paragraphs 0076 and 0078*), to increase the coercivity (*as evidenced by Bertero et al. – col. 10, lines 21 – 24; col. 11, lines 28 – 32 where Ku is proportional to Hk; and col. 20, line 60 bridging col. 21, line 11*) and/or to control the normalized coercive force (Hc/Hk^{grain}) inorder to produce a low noise medium capable of high recording densities (*as evidenced by Takahashi et al. – col. 25, lines 9 – 13*).

Therefore, the Examiner deems that even in the case where the anisotropic magnetic field may not inherently meet applicants' claimed limitations it would have still been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as the anisotropic magnetic field through routine experimentation, especially given the knowledge in the art noted above regarding the effect of the anisotropic magnetic field on the write demagnetization properties, the transitional position of the magnetic layer and the noise of the recording

medium. *In re Boesch*, 205 USPQ 215 (CCPA 1980), *In re Woodruff*, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Regarding claim 2, the limitation "wherein said metal underlayer and said ferromagnetic metal layer are formed in a film fabrication chamber with an ultimate vacuum at a 10^{-9} Torr level, using a film fabrication gas with an impurity concentration of no more than 1 ppb" is a product-by-process limitation and is not further limiting in so far as the structure of the product is concerned. In the instant case, the claimed and prior art products are deemed substantially identical since both the claimed and prior art are substantially identical in both structure and composition (i.e. a Co-alloy magnetic layer over a $CrMo_{20}$/Cr dual underlayer).

Regarding claims 3 – 13, 19 and 20, Malhotra et al. disclose underlayers and ferromagnetic layers meeting applicants' claimed structural limitations (*Tables 1 and 2 and Figures*). Regarding the limitations "with different lattice constants" (claim 6), "wherein a lattice misfit ... is a value from 0.5% to 2.5%" (claim 10), "wherein said lattice misfit ... is a value from 0.5% to 1.5%" (claim 11), "wherein in a crystal lattice of said ferromagnetic metal layer ... within a plane of said ferromagnetic metal layer" (claim 12), and "wherein an axial length ratio a/b ... is within a range of 1.002 to 1.008" (claim 13), the Examiner notes that the claimed and prior art products are substantially identical in both structure and composition (*Table 1: Co-alloy magnetic layer over $CrMo_{20}$/Cr dual underlayer and Table 2: Co-alloy magnetic layer over $CrTa_{10}$/Cr dual underlayer*) and, therefore, the Examiner deems that the above claimed limitations would have inherently been present in the prior art product for the reasons cited above.

However, even in the case where the claimed crystalline lattice properties may not be inherently present, the Examiner notes that it would have still been obvious to one of ordinary skill in the art to optimize the crystalline lattice properties to values meeting applicants' claimed limitations inorder to minimize lattice misfit (*as evidenced by Akimoto et al. – Paragraph 0079*) to improve the magnetic properties (*as evidenced by Bertero et al. – col. 4, lines 11 – 15, 40 – 44 and 59 – 67; col. 5, lines 5 – 9; col. 12, lines 48 – 57; col. 13, lines 50 – 59; col. 20, lines 36 – 41; col. 20, line 60 bridging col. 21, line 11; and Table 1*) including the squareness (*as evidenced by Howard – Figures 2A, 2B and 3; and col. 4, lines 3 – 6 and 41 - 55*).

Therefore, the Examiner deems that even in the case where the crystalline lattice properties may not inherently meet applicants' claimed limitations it would have still been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as the lattice misfit and axial length ratio through routine experimentation, especially given the knowledge in the art noted above regarding the effect of the crystalline lattice properties on lattice misfit and the magnetic properties, including coercivity and squareness.

Regarding claim 17, Malhotra et al. disclose apparatus elements meeting applicants' claimed limitations (*col. 6, lines 1 – 8*).

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following prior art all contain structures substantially

identical to applicants (i.e. Co-alloy magnetic layers over a dual Cr-alloy/Cr or Cr-alloy underlayer) (see highlighted/outlined sections in all references): Hirayama et al. (J. App. Phys, 87(9), 2000, 6890 – 6892), Ohnami et al. (U.S. Patent No. 6,255,006 B1), Wong et al. (U.S. Patent No. 6,423,431 B1), Chen (U.S. Patent No. 6,537,686 B1), Hosoe et al. (U.S. Patent No. 6,544,667 B1), and Hanawa et al. (U.S. Patent App. No. 2002/0122960 A1).

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (703) 308-1737. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Thibodeau can be reached on (703) 308-2367. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.

KMB
May 11, 2003

Paul Thibodeau
Supervisory Patent Examiner
Technology Center 1700